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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/AU91/00138</p> <p>(22) International Filing Date: 11 April 1991 (11.04.91)</p> <p>(30) Priority data: PK 1081 9 July 1990 (09.07.90)/ AU</p> <p>(71) Applicant (for all designated States except US): S.C.I. OPERATIONS PTY LIMITED trading as SMORGON PLASTICS [AU/AU]; Slough Business Park, Holker Street, Silverwater, NSW 2141 (AU).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): COLAHAN, David, Geoffrey [AU/AU]; KROCZAK, Michael [AU/AU]; OLDS, Mervyn, Richard [AU/AU]; THORPE, Steven, John [AU/AU]; Cnr Holker &amp; Shaft Streets, Silverwater, NSW 2141 (AU).</p>	<p>(74) Agent: H.R. HODGKINSON &amp; CO.; 26A Alfred Street, P.O. Box 136, Milsons Point, NSW 2061 (AU).</p> <p>(81) Designated States: AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH (European patent), CM (OAPI patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GA (OAPI patent), GB (European patent), GR (European patent), HU, IT (European patent), JP, KP, KR, LK, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL (European patent), NO, RO, SD, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.</p> <p>Published With international search report.</p>	
<p>(54) Title: AN IMPROVED CONTAINER</p> <div data-bbox="503 1134 1136 1764"> </div> <p>(57) Abstract</p> <p>A container (1) having a base configuration (4) of a generally circular outline and which includes five legs (6) extending therefrom and terminating in foot portions (7). The legs (6) are formed so as to be spaced apart one from the other by spacing ribs or webs (8), the angular extent of each spacing rib or web (8) being no greater than 8°.</p>		

**+ DESIGNATIONS OF "SU"**

It is under examination in which parts of the former Soviet Union the designation of the Soviet Union has effect.

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AN IMPROVED CONTAINER  
-----FIELD OF INVENTION

This invention relates to an improved container and in particular to an improvement to a plastic container such as a moulded or blow-moulded plastic container, having a base of a particular shape and configuration, such as to impart, inter alia, features of strength, rigidity and stability to such containers.

BACKGROUND TO THE PRESENT INVENTION

Many containers are known and have been produced, which include bases having a configuration which is essentially hemispherical and which have projecting therefrom a plurality of spaced-apart legs terminating in feet, the portions of the base configuration between the legs being in the form of webs of varying width. Such bases have been found to be vulnerable and unstable, especially when such containers are internally pressurised, such as for the sale of carbonated beverages and the like.

It is generally accepted that for such containers to be commercially acceptable, they must be able to withstand the internal pressure (resulting from being pressurised), they must have a certain resistance to dropping and they must have standing stability and strength.

Such arrangements have already been described and disclosed, for example in United States patent specification No 3,598,270 and Australian patent specification No 26754/88.

Particularly in the prior art Australian patent specification No 26754/88, reference is made to the need to reduce the number of legs in a base to five from six, and to extend the width of the spacing between each of the five legs beyond that found in prior containers incorporating a base having

six legs. It is, for example, stated in Australian patent specification No 26754/88, that there are substantial advantages in providing a base for a container, wherein the base has five legs, the spacing between each of the five legs being of an angular extent of  $30^{\circ}$  and greater. In such arrangements, the angular extent of each leg is in the order of  $40^{\circ}$ . It is stated in the Australian patent specification No 26754/88 and in United States patent specification No 4,785,949 that such spacings between the five legs are substantially greater than the spacings found in containers referred to as being prior art before the filing of Australian patent specification No 26754/88 and United States patent specification No 4,785,949.

In such prior art arrangements involving containers having bases with six feet, it is stated that the spacing between each foot had an angular extent in the order of  $20^{\circ}$  and that this led to, and resulted in, problems.

It has been found that the configurations and dimensions associated with known containers and as referred to in Australian patent specification No 26754/88 and United States patent specification No 4,785,949 are not commercially satisfactory. Such configurations and dimensions do not impart sufficient features of strength and stability to the containers and the bases therefor.

It is an object of this invention to provide a straightforward and efficient container having a base configuration which meets commercial requirements and overcomes, or at least minimises, previous problems.

Other objects of this invention will become apparent from the following description.

SUMMARY OF THE PRESENT INVENTION

According to one aspect of this invention there is provided a container having a base configuration of a generally circular outline and including five legs extending therefrom and terminating in foot portions; webs being provided between said legs; characterised in that the angular extent of each web is no greater than  $8^{\circ}$ .

According to a further aspect of this invention there is provided a container having a base configuration of a generally circular outline and including five legs extending therefrom and terminating in foot portions; webs being provided between said legs; characterised in that the angular extent of each web is from  $6^{\circ}$ - $8^{\circ}$ .

According to a further aspect of this invention there is provided a container having a base configuration of a generally circular outline and including five legs extending therefrom and terminating in foot portions; webs being provided between said legs; characterised in that the angular extent of each web is  $6.5^{\circ}$ .

According to a further aspect of this invention there is provided a container having a base configuration of a generally circular outline and including five legs extending therefrom and terminating in foot portions; webs being provided between said legs; characterised in that the angular extent of each web is  $7^{\circ}$ .

According to a further aspect of this invention there is provided a container having a base configuration of a generally circular outline and including five legs extending therefrom and terminating in foot portions; webs being provided between said legs; characterised in that the angular extent of each web is no greater than  $8^{\circ}$ , and wherein the

width of said webs decreases outwardly towards the periphery of said base.

According to a further aspect of this invention there is provided a container having a base configuration of a generally circular outline and including five legs extending therefrom and terminating in foot portions; webs being provided between said legs; characterised in that the angular extent of each web is from  $6^{\circ}$  to  $7^{\circ}$ , and wherein the width of said webs decreases outwardly towards said periphery from 9.0 mm to 6.0 mm.

According to a further aspect of this invention there is provided a container having a base configuration of a generally circular outline and including five legs extending therefrom and terminating in foot portions; webs being provided between said legs; characterised in that the angular extent of each web is from  $6^{\circ}$  to  $7^{\circ}$ , and wherein the width of said webs decreases outwardly towards said periphery from 6.0 mm to 5.0 mm.

#### BRIEF DESCRIPTION OF ACCOMPANYING DRAWINGS

This invention will now be described by way of example only and with reference to the accompanying drawings, wherein:

Fig. 1 is a perspective view of a container according to one form of the present invention,

Fig. 2 is an inverted underside view of a base configuration of a container according to one form of the present invention,

Fig. 3 is an underside view of a base configuration of a container according to one form of the present invention and

Fig. 4 is an underside view of a base configuration of a container according to one form of the present invention.

#### DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

This invention will now be described by way of example only and it should be appreciated that improvements and modifications may be made thereto without departing from the scope of the invention, as defined by the appended claims.

As referred to hereinbefore, the present invention provides a container, preferably a plastic container, which incorporates a base configuration which imparts features of commercial acceptability, strength and stability to the container, as compared with containers previously used on the market and as previously disclosed.

Referring to the accompanying drawings, the container 1 is in the form of a bottle, and is formed of an appropriate thermoplastic material or plastic material, and is preferably moulded. The bottle 1 has a neck 2 and a shoulder 3, the container being of a generally elongate cylindrical configuration and having a base configuration 4. The base configuration 4 is of a generally circular and hemispherical configuration.

The base configuration 4 is formed with five spaced-apart leg formations 6 which are provided with feet 7 at the ends thereof.

The legs 6 are formed so as to be spaced apart one from the other by spacing ribs or webs 8.

The webs 8 between the legs 6 extend from a substantially medial point of the underside of the base 4, to the outer

periphery of the base, the webs preferably tapering and thus lessening in width as they extend outwardly towards the periphery of the base.

It has been further found that in comparison to the dimensions utilised in prior art containers, and in particular as referred to in Australian patent specification No 26754/88 and United States patent specification No 4,785,949, the present container has substantially enhanced features of stability and acceptance, by reducing substantially the width and angular extent of the webs between the legs 6.

Thus, in the present invention, the webs 8 extending between the legs 6 have a substantially reduced width and are defined by an angular extent of less than  $8^{\circ}$ .

As will be appreciated, given the substantially circular nature of the base configuration and the provision of five-leg formations, the angular extent allowed for each leg and web formation is  $72^{\circ}$ . Thus, in the present invention the width of each web is defined by each web having an angular extent of less than  $8^{\circ}$ . This is substantially less than the angular extents referred to in the prior art and in particular referred to in Australian patent specification No 26754/88 and United States patent specification No 4,785,949. The reduced angular extent of the webs, and the increased angular extent of each leg formation, has however resulted in a substantially improved container.

Referring now to Fig. 3 of the accompanying drawings, this shows an underside view of a base configuration according to one form of the present invention. In such a form of the invention the angular extent of each web formation 8 is  $7^{\circ}$  wherein the angular extent of each leg formation 6 is  $65^{\circ}$ . In the form of the invention shown with reference to Fig. 3 of



the drawings and by way of example only, the webs 8 taper as they extend outwardly towards the periphery of the base, the webs 8 tapering from an initial width of 6 mm to a width of 5 mm at or adjacent the periphery of the base configuration. This is however by way of example only.

Referring to Fig. 4 of the accompanying drawings, in this form of the invention the width of the webs 8 is defined by the webs having an angular extent of  $6.5^{\circ}$ , whereas the angular extent of each leg portion 6 is  $65.5^{\circ}$ . Again, by way of example only, in this preferred form of the invention the webs taper or diminish in width as they extend outwardly towards the periphery of the base configuration, having an initial width of 9 mm and tapering to an outer width of 6 mm.

The examples referred to above, with particular reference to Figs 3 and 4 of the drawings are by way of example only, but it will be appreciated that the angular extent of each web 8 in a base configuration having five legs will be less than  $9^{\circ}$  and preferably in the range of from  $6.5 - 7^{\circ}$ .

Thus, it should be appreciated that in the present invention, the width and annular extent of the webs 8 is reduced in relation to previously known and used webs, the dimensions of such angular extents and webs being referred to and described hereinbefore. It has been found that by reducing the angular extent and width of the webs, such as in the manner referred to hereinbefore, additional material utilised in the formation of the base is able to be utilised and formed in the formation of the legs 6, so that the legs and feet are extended and expanded outwardly to a greater extent than has previously been possible, these extended legs and feet allowing for a substantially improved container and in particular resulting in a container having enhanced features of stability.

It should be appreciated that the invention has been described by way of example only and that modifications and improvements may be made to the invention without departing from the scope thereof as defined in the appended claims.

## THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A container having a base configuration of a generally circular outline and including five legs extending therefrom and terminating in foot portions; webs being provided between said legs; characterised in that the angular extent of each web is no greater than  $8^{\circ}$ .
2. A container as claimed in claim 1, characterized in that the angular extent of each web is from  $6^{\circ}$  -  $8^{\circ}$ .
3. A container as claimed in claim 1 or claim 2, wherein the angular extent of each web is  $6.5^{\circ}$ .
4. A container as claimed in claim 1 or claim 2, characterized in that the angular extent of each web is  $7^{\circ}$ .
5. A container as claimed in any one of the preceding claims, and wherein the width of said webs decreases outwardly towards the periphery of said base.
6. A container as claimed in claim 1 or claim 2, characterized in that the angular extent of each web is from  $6^{\circ}$  to  $7^{\circ}$ , and wherein the width of said webs decreases outwardly towards the periphery of said base, from 9 mm to 6 mm.
7. A container as claimed in claim 1 or claim 2, characterized in that the angular extent of each web is from  $6^{\circ}$  to  $7^{\circ}$  and wherein the width of said webs decreases outwardly towards the periphery of said base, from 6 mm to 5 mm.
8. A container as claimed in claim 1, substantially as hereinbefore described, and with reference to Figs 1, 2 and 3 of the accompanying drawings.

9. A container as claimed in claim 1, substantially as hereinbefore described, with reference to Figs 1, 2 and 4 of the accompanying drawings.

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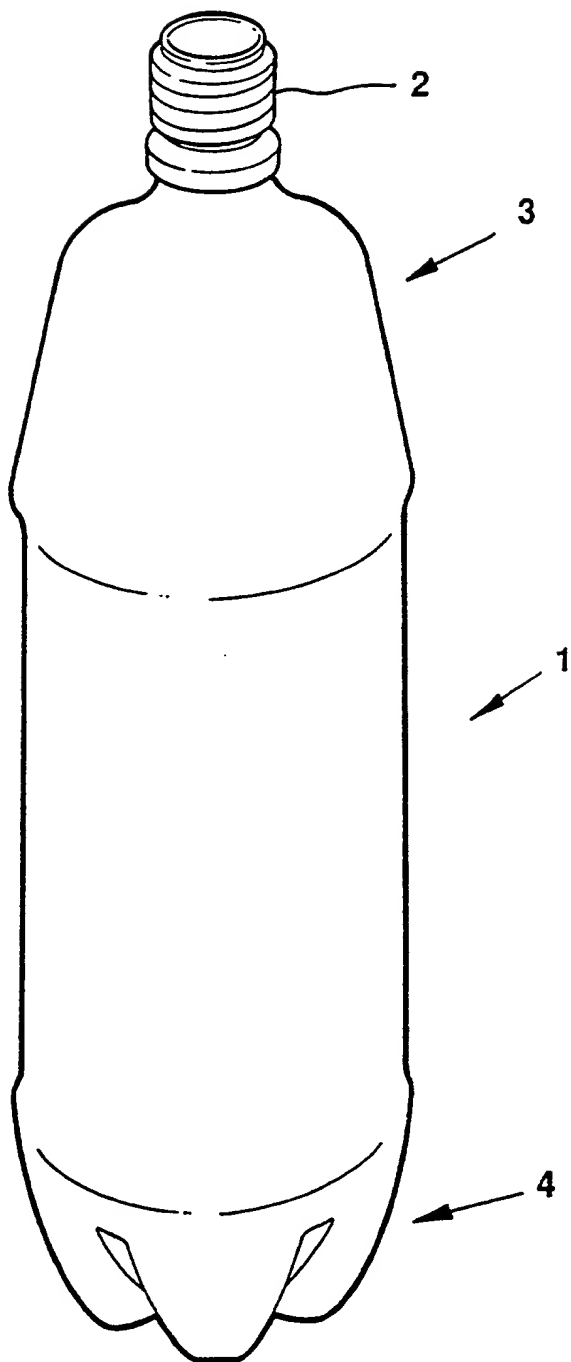


FIGURE 1

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2/3

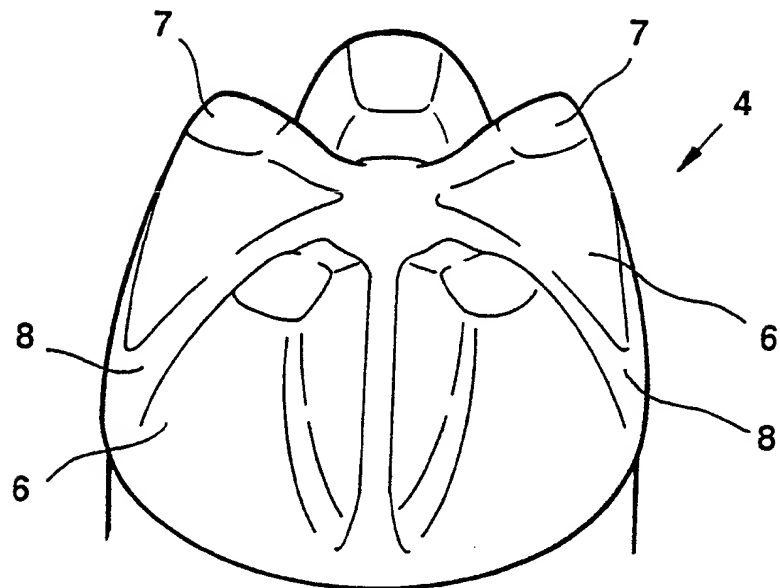


FIGURE 2

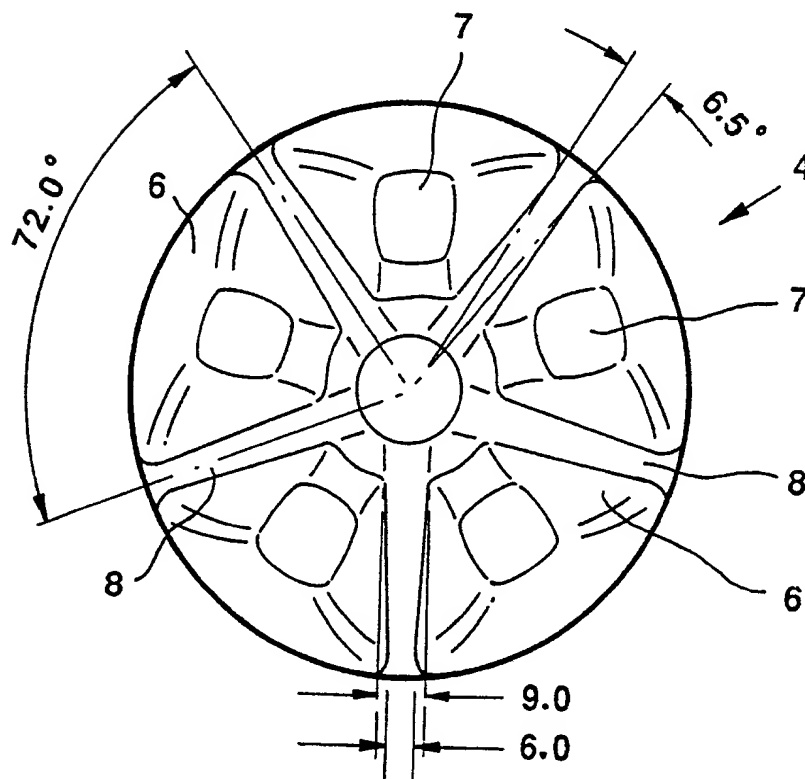


FIGURE 3

SUBSTITUTE SHEET



# INTERNATIONAL SEARCH REPORT

International Application No. **PCT/AU 91/00138**

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) 6				
According to International Patent Classification (IPC) or to both National Classification and IPC				
Int. Cl. <sup>5</sup> B65D 1/02, 23/00				
<b>II. FIELDS SEARCHED</b>				
Minimum Documentation Searched 7				
Classification System	Classification Symbols			
IPC	B65D 1/02, 23/00			
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8				
AU : IPC as above				
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> 9				
Category*	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13		
X	RESEARCH DISCLOSURE (March 1980 Number 191) 12 May 1980 (12.05.80) See page 113 disclosure 19122.	(1-9)		
X,Y	EP 244128 (FIRRENYLE LIMITED) 4 November 1987 (04.11.87) See Fig 2.	(1-9)		
X,Y	US,A, 4294366 (CHANG) 13 October 1981 (13.10.81) See Fig 8.	(1-9)		
X,Y	AU,A, 35995/89 (HOOVER UNIVERSAL INC) 21 December 1989 (21.12.89) See Fig 9 legs 26 and webs 30.	(1-9)		
X,Y	EP 225155 (MENDE BROTHERS LTD) 10 June 1987 (10.06.87) Whole document. See column 2 lines 17-20 for discussion of number of feet.	(1-9)		
X,Y	AU 56254/86 (MERIMATE LIMITED) 13 October 1986 (13.10.86) Whole document. See page 8 lines 17-24 for discussion of number of feet.	(1-9)		
(continued)				
<p>* Special categories of cited documents: 10</p> <table style="width: 100%;"> <tr> <td style="width: 50%;"> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 50%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"E" document member of the same patent family</p> </td> </tr> </table>			<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"E" document member of the same patent family</p>
<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"E" document member of the same patent family</p>			
<b>IV. CERTIFICATION</b>				
Date of the Actual Completion of the International Search 26 June 1991 (26.06.91)	Date of Mailing of this International Search Report <b>02 JUL 1991</b>			
International Searching Authority  Australian Patent Office	Signature of Authorized Officer  <i>R. Kirby</i> R. KIRBY			



## FURTHER INFORMATION CONTAINED FROM THE SECOND SHEET

X,Y	DE 2920122 (VOLTH FISCHER KUNSTSTOFFTECHNIK GmbH & Co KG) 20 November 1980 (20.11.80) See Fig 2 disclosing five feet and relatively narrow webs therebetween.	(1-9)
P,Y	US,A, 4978015 (NORTH AMERICAN CONTAINER INC) 18 December 1990 (18.12.90) Whole document. Narrow webs disclosed in Figs 2 and 8; column 8 discloses that the number of feet is not limited to embodiments.	
Y	AU,A, 37948/89 (HOOVER UNIVERSAL INC) 19 January 1990 (18.01.90) See Fig 2 disclosing narrow webs between legs. Invention not limited to number of feet of illustrated embodiment.	(1-9)
Y	AU,A, 35057/89 (HOOVER UNIVERSAL INC) 18 January 1990 (18.01.90) See Fig 2 and narrow webs 26 between feet 28. Invention not limited to number of feet of illustrated embodiment.	(1-9)

## V. [ ] OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE 1

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [ ] Claim numbers ..., because they relate to subject matter not required to be searched by this Authority, namely:

2. [ ] Claim numbers , because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. [ ] Claim numbers ..., because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4 (B):

## VI. [ ] OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING 2

This International Searching Authority found multiple inventions in this international application as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. [ ] As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

## Remark on Protest

[ ] The additional search fees were accompanied by applicant's protest.  
[ ] No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE 1

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim numbers ..., because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim numbers ..., because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim numbers ..., because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4 (a):

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING 2

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:
3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:
4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

## Remark on Protest

- ☐ The additional search fees were accompanied by applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON  
INTERNATIONAL APPLICATION NO. PCT/AU 91/00138

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report	Patent Family Members			
US 4294366				
AU 35995/89	BR 8903093 FI 892965 NO 892524 US 4865206	DK 2987/89 HU 53016 NZ 229582	EP 346858 JP 2057545 ZA 8903987	
EP 225155				
AU 56254/86	EP 215881	WO 8605462		
AU 37948/89	BR 8903561 DK 3508/89 HU 54086 US 4867323	CN 1039387 EP 350782 NO 892904 ZA 8905053	DD 283978 FI 893424 NZ 229799	
US 4978015				
AU 35057/89	EP 348028	JP 2057543	US 4850493	
DE 2920122				
EP 244128	GB 2189214			

